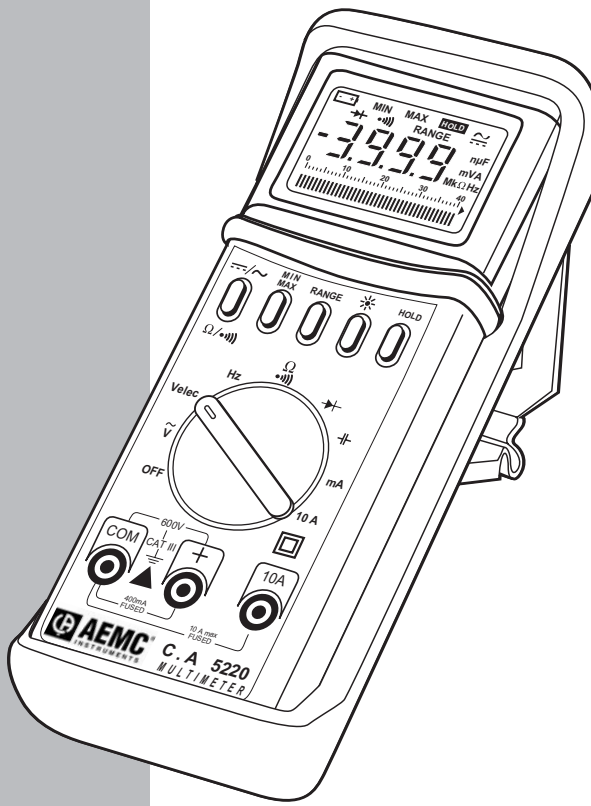
MULTIMETER

Digital Multimeters
Model C.A 5210
Model C.A 5220



ENGLISH **User manual**

AEMC® INSTRUMENTS

⚠ **Warning !** Please refer to the User's Manual before using the instrument.
In this User's Manual, the instructions preceded by the above symbol, should they not be carried out as shown, can result in a physical accident or damage the instrument and the installations.

This device is protected by a double insulation or by a reinforced insulation. No linking is required from the protection earth terminal to ensure the electrical security.

Thank you for purchasing a **C.A 5210** or **C.A 5220 Multimeter**.
To get the best service from this instrument :

- **read** this user manual carefully,
- **respect** the safety precautions detailed.

⚠ SAFETY PRECAUTIONS ⚠

- Respect the value and the type of fuses or there is risk of deterioration of the instrument and invalidation of the warranty.
  - Fuse 0.4 A HBC - 600 V min (6.3 x 32 mm)
  - Fuse 12 A HBC - 600 V min (10.3 x 38 mm)
- Never use on voltage to earth circuits above 600 V, with a voltage surge category of over III, that is to say, fixed industrial and domestic installations (ref. IEC 664-1).
- To be used indoors in environments with a maximum pollution degree of 2 (ref. IEC 664-1), a temperature between 0 and 50°C and relative humidity below 70%.
- Use accessories which conform to safety standards (IEC 1010-2-031), with a minimum voltage of 600 V and a voltage surge of category III.
- Never open the multimeter case before disconnecting from any electrical source.
- Never connect up to a circuit to be measured if the multimeter case is not closed correctly.
- Before any measurements are taken, ensure the leads and switch are in the correct positions.
- Never measure resistances on a circuit with the power switched on.
- For the C.A 5220 multimeter, when making current measurements, always switch Off the power supply to the circuit before connecting or disconnecting the instrument to the circuit.

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1 - PRESENTATION

The C.A 5210 and C.A 5220 are designed for the daily needs of professionals in electricity.
They have a dual display :
- digital 4000 counts
- 40 segment bargraph

The range selection is automatic, with the possibility of manual selection on the C.A 5220. It switches Off automatically if no control or function button is pressed for 30 minutes.

Model C.A 5220, which is more complete, in particular allows the direct measurement of current and frequency measurement (see Description chapter).

Various measurement accessories broaden the scope of application or provide the multimeter with new functions.

See the list of accessories and references on the " To Order " page (Documentation upon request).

Note: *Only use accessories suitable for the voltage and the voltage surge category of the circuit to be measured (as per IEC 1010).*

2 - DESCRIPTION

① LIQUID CRYSTAL DISPLAY

- 4000 measurement counts - height of digits 0.4" (10 mm)
  Rate: 2 measurements / second
- 40 segment bargraph
  Rate: 20 measurements/sec
  Note: *the bargraph is not operational for frequency and capacitance measurements*
- Automatic display of all the symbols for controls, ranges and functions
- ⊏+ : low battery indication
- Overload indication :
  - the 4 on the left flashes
  - arrow at the end of the bargraph

② CONTROL BUTTONS

⎓ / ~ and Ω / ●)))

To change from AC (~) to DC (⎓) and reverse, on voltage and current :To change from continuity test ●))) to resistance measurement Ω and back, on ohmmeter function.
Note: *Automatic selection of AC and ●))) when it is switched on.*

HOLD

To freeze the last measurement (digital and bargraph).

MIN - MAX (C.A 5220 only)

To successively display the min or max values.
The C.A 5220 then changes to manual range selection.
HOLD is also displayed. Min. acquisition time 500ms.
Note: *The user can keep the min/max values in memory if you press the HOLD button, PRIOR to disconnecting the test leads.*

RANGE (C.A 5220 only)

Range selection: To change from automatic mode to manual mode. A prolonged press on this button allows you to exit the manual mode. The automatic mode is selected when the instrument is switched On.
Note*: This button also selects the sensitivity for the frequencemeter function (Hz).*

☼ (C.A 5220 only)

To switch on and off the display backlighting.
Note : *Auto off after 5 minutes.*

③ FUNCTION SELECTOR SWITCH

OFF	Off position
V	DC and AC voltages up to 600V, with high impedance: 10MΩ
Velec	AC voltages up to 600V, with low impedance: 270kΩ ***Note:*** *Also available on DC voltage.*
Hz	(C.A 5220 only) Frequencies of voltages, up to 200kHz
•))) Ω	Continuity sound test for a resistance R ≤ 40Ω, and resistance measurements up to 40MΩ ***Note:*** *The continuity test •))) is selected automatically when the instrument is switched on.*
→|–	Diode test. Measurement of the voltage of the junction in forward direction
⊣⊢	Capacitances up to 40µF
A	(C.A 5220 only) $10A_{AC/DC}$ current ranges (via the 10A terminal)
mA	(C.A 5220 only) Current ranges up to $400mA_{AC/DC}$ (via the + terminal)

④ TERMINALS

Ø 4mm safety terminals

- **COM :** common, black
- **+ :** red
- **10A** (C.A 5220 only) : red lead for the $10A_{AC/DC}$ ranges

3 - DC AND AC VOLTAGE

- Connect the leads to the multimeter and connect it in parallel to the circuit to be tested.
- Place the selector switch on voltmeter (V) function (high impedance). The instrument is in AC mode. Press the AC/DC button to select DC and vice versa.
- Automatic range selection: read the measured value.
- Freeze the value, by pressing the HOLD button.

C.A 5220 only

If necessary, press the following buttons:

- RANGE to select the ranges manually
- MIN/MAX to read the min or max values
- ☼ to switch on the backlight of the display

4 - VOLTAGES WITH LOW IMPEDANCE : V elec

Identical procedure (as above) except for positioning the selector switch on V elec.

DC voltages

V DC	400mV	4V	40V	400V	600 V (1)
Digital resolution	0.1 mV	1mV	10mV	100mV	1V
Bargraph resolution	10mV	100mV	1V	10V	100V
V DC Impedance	10MΩ				
V elec Impedance	270kΩ				
Accuracy	±1% of Reading ± 1ct				
Permitted overload	600V rms and 900V peak				

(1) 4000 count display limited to 600 V

AC voltages

V AC	400mV (1)	4V	40V	400V	600V (2)
Digital resolution	0.1mV	1mV	10mV	100mV	1V
Bargraph resolution	10mV	100mV	1V	10V	100V
V AC Impedance	10MΩ				
V elec Impedance	270kΩ				
Accuracy (3)	±5% R	±1.5% of Reading ± 1ct			
Permitted overload	600V rms and 900V peak				

(1) C.A 5220 only. Press the RANGE button.
Min measurement : 40mV

(2) 4000 count display limited to 600V

(3) Use on frequency : 40Hz to 500Hz, except the 400mV range from 40Hz to 100Hz.

5 - CONTINUITY AND RESISTANCE

⚠ **Never test a resistance on a live circuit**

- Connect the leads to the multimeter and to the circuit or the component to be tested.
- Place the selector switch on the ohmmeter function •))) Ω
  Press the **Ω / •)))** button to change from continuity to resistance measurement and vice versa.

- Automatic range selection : read the measured value
- Freeze the value, by pressing the HOLD button.

If necessary, press the following buttons:

- RANGE to select the range manually
- MIN-MAX to read the min or max values
- ☼ to light the display

5-1 Resistances

Ω	400Ω	4 kΩ	40 kΩ	400 kΩ	4 MΩ	40 MΩ
Digital resolution	0.1Ω	1Ω	10Ω	100Ω	1 kΩ	10 kΩ
Bargraph resolution	10Ω	100Ω	1 kΩ	10 kΩ	100 kΩ	1 MΩ
Accuracy	± 1.5% R ± 8 cts	± 1.5% R ±3cts				± 3% R ± 5 cts
Voltage on open circuit	≤ 0.5V DC					
Protection	500V rms and 750V peak					

5-2 Continuity sound test •))

On the 400Ω range, continuous beep for a resistance R ≤ 40Ω.

6 - DIODE TEST

⚠ **Never test a diode on a live circuit**

- Connect the leads to the multimeter and to the terminals of the component to be tested.
- Place the selector switch on the diode function →|← :
  - in forward direction the display gives the value of the junction in volts (resolution 1mV)
  - accuracy : ± 2% of Reading ±15mV
  - open circuit voltage : ≥ 3V
  - short circuit current : 0.8mA
  - in reverse direction the display indicates the open circuit voltage, around 3V.
- Freeze the value, by pressing the HOLD button.
- With this function it is thus possible to test standard diodes, led's or any other semiconductor which has a junction that corresponds to a direct voltage of less than 3V.

7 - CAPACITANCE

⚠ **Never make a capacitance test on a live circuit**

Always respect the polarity of electrolytic condensers. This type of condenser may be sensitive to temperature, so avoid touching it during measurement.

- Connect the leads to the multimeter and to the terminals of the condenser.
- Place the selector switch on the capacitance meter function ⊣⊢
- Automatic range selection: read the measured value

Note: *The bargraph is not operational on capacitance measurement*

- Freeze the value, by pressing the HOLD button

C.A 5220 only

If necessary, press the following buttons :

- RANGE to select the ranges manually
- MIN-MAX to read the min or max values
- ☼ to light the display

⊣⊢	4nF *(1)*	40nF	400nF	4µF	40µF
Resolution	1pF	10pF	100pF	1nF	10nF
Accuracy	± 3% R ±400cts	± 3% R ±25cts	± 5% R ±10cts		± 15% R ±10cts
Protection	500V rms and 750V peak				

(1) Min measurement: 400 pF

8 - FREQUENCY

(C.A 5220 only)

- Connect the leads to the multimeter and in parallel to the circuit to be tested.
- Place the selector switch on the Hz voltage frequency function.
- Automatic range selection : read the measured value

Note: *The bargraph is inhibed when measuring frequency.*

- If necessary, press the following buttons:
  - MIN-MAX to read the min or max values
  - ☼ to light the display

Note : *extension to 10000cts*

Hz	100Hz	1kHz	10kHz	100kHz	400kHz
Resolution	0.01Hz	0.1Hz	1Hz	10Hz	100Hz
Accuracy	± 0.1% of Reading ± 2cts				
Permitted overload	500V rms and 900V peak				
Operating range (1)	4V to 600V				

(1) The RANGE button on this function selects the trigger level: 10mV, 100mV or 1V (10mV is selected when the instrument is switched on).

9 - DC and AC CURRENT

(C.A 5220 only)

⚠ **Always switch Off the circuit to be tested before connecting the multimeter to the circuit**

- **Warning:** connect the leads to the multimeter and connect in series to the circuit
  - the red lead to the + terminal up to 400mA
  - the red lead to the 10A terminal, from 400mA to 10A
- Place the selector on the A or mA ammeter function
  Press the AC/DC button to select AC or DC
- Energize the circuit to be tested
- Automatic range selection : read the measured value
- If necessary, press the following buttons
  - RANGE to manually select the ranges
  - MIN-MAX to read the min or max values
  - ☼ to light the display

DC currents

A DC	40mA	400mA	10A (1)
Voltage drop (2)	600mV	4.5V	600mV
Digital resolution	10µA	100µA	10mA
Bargraph resolution	1mA	10mA	1A
Accuracy	± 1.5% of Reading ±1ct		± 1.5% of Reading ±2cts
Protection (3)	Fuse 0.4A HBC		Fuse 12A HBC

AC currents

AAC	40mA	400mA	10A (1)
Voltage drop (2)	600mV	4.5V	600mV
Digital resolution	10µA	100µA	10mA
Bargraph resolution	1mA	10mA	1A
Accuracy (4)	± 1.5% of Reading ±1ct		± 2% Reading ± 2cts
Protection (3)	Fuse 0.4A HBC		Fuse 12A HBC

(1) 4000 count display limited to 10A Between 5A and 10A, to avoid overheating, limit the operating time to 10 minutes

(2) Voltage drop at the terminals for 40mA, 400mA, 10 A

(3) Permitted overloads :
600mA for 30 seconds for the 400mA range
15A for 30 seconds for the 10A range

(4) Use on frequency : 40Hz to 500Hz

10 - GENERAL SPECIFICATIONS

10-1 Dimensions and weight

■ 2.5 x 7 x 1.7 " (64 x 177 x 42mm) ■ 12.3 ounces (350g)

10-2 Power supply

■ Two batteries 1.5V (type R6)
■ Service life: 200 hours with R6 battery or 400 hours with alkaline battery LR6 12,000 measurements of 1 minute with R6 battery
■ Low battery indication: [- +]
Note: *Place on diode tests (open circuit) to display the battery voltage*
■ Auto off after 30 minutes
Note : Switch On again via the OFF position or by pressing the ✳ button

10-3 Buzzer

■ Continuous beep for the continuity test
■ Intermittent beep each time the switch or buttons are pressed, and for the overload indication.
Note : *No beep on ✳ button and on switch between V and Velec*

10-4 Climatic conditions

■ Temperature: use: 0°C to +50°C / storage : -20°C to +60°C
■ Relative humidity: use : ≤ 80% RH
storage : ≤ 90% RH (up to 45°C)

10-5 Conformity with international standards

10-5-1 Electrical safety (IEC 1010-1)

■ Double insulation: ⧈ ■ Installation category: III
■ Degree of pollution: 2 ■ Assigned voltage: 600V

Note: *This multimeter, of overvoltage category III satisfies the severe requirements of reliability and availability corresponding to industrial and domestic permanent installations (IEC 664-1).*

10-5-2 Electromagnetic compatibility: conforms to CE

■ Emission (EN 50081-1) ■ Immunity (EN 50082-1)

10-5-3 Mechanical protection

■ Degree of watertightness (IEC 529) : protection index IP 50

11 - TO ORDER

C.A 5210 ..... **Cat #2116.74**
C.A 5220 ..... **Cat #2116.75**
Supplied with a shockproof case, pair of leads with probes attached, two 1.5V "AA" batteries and this user manual

Accessories

- AC Current Probe Model MN251 (200A$_{AC}$) ..... **Cat #2115.77**
- AC Current Probe Model MD303 (500A$_{AC}$) ..... **Cat #1201.21**
- AC Current Probe Model SR652 (1000A$_{AC}$) ..... **Cat #2113.46**
- AC/DC MicroProbe Model K110
(from 100µA$_{AC/DC}$ to 300mA$_{AC}$/ 450mA$_{DC}$) ..... **Cat #2111.73**
- AC/DC Current Probe model MR410
(400A$_{AC}$/600A$_{DC}$) ..... **Cat #1200.70**
- AmpFlex™ Model 1000-24-1-1 (1000A$_{AC}$) ..... **Cat #2112.39**
- Replacement leads ..... **Cat #2118.66**
- Soft carrying case ..... **Cat #2118.65**
- Replacement shockproof case ..... **Cat #2980.15**
- Fuse set of 10, 0.4A for C.A 5220 ..... **Cat #2970.20**
- Fuse set of 10, 12A for C.A 5220 ..... **Cat #2970.21**

12 - WARRANTY

Our guarantee is applicable for **three years** after the date on which the equipment is made available (copy available on request).

13 - MAINTENANCE

⚠ **For maintenance, use only specified spare parts. The manufacturer will not be held responsible for any accident occurring following a repair done other than by its After Sales Service or approved repairers.**

13-1 Replacing the batteries and the fuses

⚠ The multimeter must be disconnected from any electrical source.

The 1.5V batteries, as well as the 0.4A HPC and 12A HPC fuses for model C.A 5220, are accessible at the back of the instrument.

Remove the lower half of the case after removing the three screws.

Replace the faulty elements, in accordance with :

- polarity for the batteries
- the value and the type of fuses
  Fuse 0.4A HBC - 600V min (6.3 x 32mm)
  Fuse 12A HBC - 600V min (10.3 x 38mm)

13-2 Storage

If the multimeter is not to be used for a period of 60 days or more, remove the battery and store separately.

13-3 Cleaning

⚠ **The multimeter must be disconnected from any electrical source.**

To clean the case, use a cloth slightly moistened with soapy water. Rinse with a damp cloth. Then, dry rapidly with a cloth or in a hot air stream.

13-4 Repair and Calibration

To guarantee that your instrument complies with the factory specifications, we recommend that the Models C.A 5210 / C.A 5220 be submitted to our factory service center at one-year intervals for recalibration, or as required by other standards.
For instrument repair and/or calibration, please call our factory, toll-free, at **(800) 945-AEMC** (800-945-2362) :

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15 Faraday Drive
Dover, NH 03820 USA
Tel : (800) 954-2362
(603) 749-6434
Fax : (603) 742-2346

(Or contact your authorized distributor)
Costs for repair, standard calibration, and calibration traceable to N.I.S.T. are available upon request. Overseas customers must receive written authorization before returning any instrument.

13-5 Technical and Sales Assistance

If you are experiencing any technical problems, or require any assistance with the proper use or application of this instrument, please call our technical hotline :

CHAUVIN ARNOUX, Inc.
d.b.a. AEMC® Instruments
200 Foxborough Blvd.
Foxborough, MA 02035
Tel : (800) 343-1391
(508) 698-2115
Fax : (508) 698-2118

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